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an age characterized beyond all others by the useful applications of knowledge, and to be proud that such institutions as this have contributed to their promotion, have added to the intellectual wealth of society, and are prepared to go on for all time somewhat beyond the beaten pathway, but still tending higher and higher, under the wisdom of the Creator, who endows His human creatures with those faculties which enable them to look into His works and to be influenced by His word and spirit.

Proceedings at the Dinner.

The dinner was given at the HOTEL STRATFORD, S. W. corner of Broad and Walnut streets, Philadelphia, at 6 o'clock P.M., of the same day.

There were present the following gentlemen:

Richard L. Ashhurst,
 William S. Baker,
 Wharton Barker,
 Daniel G. Brinton,
 Arthur Biddle,
 Martin H. Boyè,
 William G. A. Bonwill,
 John R. Baker,
 Andrew A. Blair,
 George W. Childs,
 Robert Cornelius,
 William C. Cattell,
 Thomas H. Dudley,
 Frederick Fraley,
 Joseph C. Fraley,

William W. Griscom,
 Traill Green,
 Henry D. Gregory,
 Inman Horner,
 Edwin J. Houston,
 Henry Hartshorne,
 Joseph S. Harris,
 Henry Hazlehurst,
 William W. Jefferis,
 George DeBenneville Keim,
 William W. Keen,
 William V. Keating,
 John J. Keane,
 M. H. Messchert,
 James W. Moore,

Isaac C. Martindale,
 William V. McKean,
 John W. Mallet,
 William F. Norris,
 Charles A. Oliver,
 J. Sergeant Price,
 Samuel W. Pennypacker,
 Thomas C. Porter,
 William John Potts,
 Henry Phillips, Jr.,
 William H. Pancoast,
 James W. Robins,
 P. F. Rothermel,
 Thomas B. Reed,
 Theodore D. Rand,

William B. Rogers,
 Charles E. Sajous,
 Furman Sheppard,
 Albert H. Smyth,
 Monroe B. Snyder,
 Charles W. Shields,
 Joseph B. Townsend,
 Heber S. Thomson,
 Lyon G. Tyler,
 Richard Vaux,
 Samuel Wagner, Jr.,
 Richard Wood,
 Joseph M. Wilson,
 Charles S. Wurts,
 Sir Daniel Wilson.

The following Menu and Program of Regular
 Toasts was presented to each guest:

M E N U.

Hock.

Shrewsburys.

Sherry.

Tortue Verte Claire.

Escalopes à la Turque.

Champagne.

Timbales à la Parisienne.

Selle de Venaison.

Chicorée au Jus.

Pòmmes à la Brabant.

Artichauts à la Belleyue.

Sorbet Menthe.

Faisans Rotis.

Sauce au Pain.

Piments D'Espagne Sautés.

Terrapin à la Philadelphie.

Salade Variée.

Fromage.

Pouding Glacé à la Philosophical.

Croquants.

Liqueurs.

Fruits.

Café.

Cigars.

REGULAR TOASTS.

The language of Science and Philosophy is universal, but adopts various dialectic forms to diffuse knowledge.

Prof. JOHN W. MALLET, M.D., LL.D., F.R.S.,
Representative from the Royal Society of
London.

All research into the Book of Nature has not discovered an erratum.

Sir DANIEL WILSON, LL.D., F.R.S.E., etc.,
President of the University of Toronto.

The successful pursuit of Science expunges error: it never antagonizes truth.

Hon. LYON G. TYLER, M.A., President of
William and Mary College.

Mental Analysis is the efficient solvent of many difficulties in Science and Philosophy.

Rev. CHARLES W. SHIELDS, D.D., LL.D.,
of Princeton College.

The labors and achievements of great teachers in Science and Philosophy live after them; these are their monuments.

Rt. Rev. JOHN J. KEANE, D.D., LL.D., Presi-
dent of the Catholic University of America.

At 9 o'clock the HON. RICHARD VAUX, as toast-master, on behalf of the Committee of Arrangements, proposed consecutively the regular toasts, and, introducing the first speaker, said :

FELLOWS OF THE AMERICAN PHILOSOPHICAL SOCIETY:—By direction of the President, it becomes my happiness to shorten the time of your expectation here. I will try to relieve you of some of the pains and penalties by stating that in a few minutes you will have some tobacco, the effect of which upon your intellectual capacities will enable you clearly to understand what I am about to say to you, and to appreciate far more fully the reply that will be made. I ask you, therefore, to fill the first toast: "THE LANGUAGE OF SCIENCE AND PHILOSOPHY IS UNIVERSAL, BUT ADOPTS VARIOUS DIALECTIC FORMS TO DIFFUSE KNOWLEDGE." If you doubt the truth of that sentiment, I will ask Prof. John W. Mallet, M.D., LL.D., of the Royal Society of London, to give you any reason why that is not true.

MR. PRESIDENT:—In accepting the invitation to the Royal Society to be present in the person of a delegate on this occasion, it was the wish of the President of that Society to do full honour to the invitation, and that one of its Fellows resident in England should cross the Atlantic for the purpose, but in the time at disposal for correspondence it was not possible to find one who could undertake at present the double voyage necessary. While I regret that the Royal Society is not more worthily represented, I cannot but feel it a high honour that it falls to my lot to appear as the delegate of the oldest scientific society in the world which retains its original form to the oldest of such societies in the New World of America. And the

pleasure which I feel in serving in this capacity is increased by remembering that—long resident in this hospitable country, though without having given up my birthright of nationality beyond the sea—I have also the honour to be a member of the latter of these two bodies.

The ties between the two are of older date even than the event in your history which you this evening commemorate.

A third of a century before its present Hall was first occupied by the American Philosophical Society, Franklin, the most illustrious of its founders, and afterwards its first President, was elected a Fellow of the Royal Society, which three years before had awarded him the Copley Medal in recognition of the importance of his electrical researches, and for more than twenty years the volumes of the Philosophical Transactions record, at no infrequent intervals, communications made either by him or through him on scientific subjects.

Even through the seven long years of war which ended in separating the American colonies from the mother country, the name of Benjamin Franklin annually appears in the "Home List" of Fellows, and so continues afterwards until his death. In a letter to Mr. Benjamin Vaughan, of London, dated 2d of November, 1789, Franklin says: "I have not received the Philosophical Transactions for the two or three last years. They are usually laid by for me at the Society's House, with my name upon them, and remain there until called for. I shall be much obliged to you, if you can conveniently take them up and send them to me"—thus showing his continued interest in the work of the society but a few months before his death.

On the other hand, the President of the Royal Society in 1789, and in all for forty-one years, a longer tenure of the office than that of any other President, was Sir Joseph Banks,

who in 1787 was elected a member of the American Philosophical Society, and at a meeting of the latter, on April 18, 1788 (Franklin presiding), returned thanks for his election and communicated "A very curious account of pure iron in a metallic (*sic*) state lately found in South America."

Not in membership alone, but also in scientific activity, does there remain evidence of early relations between the two societies. In the Philosophical Transactions for 1769 we find the "Account of the Transit of Venus over the Sun's Disc, as observed at Norriton in the County of Philadelphia and Province of Pennsylvania, June 3, 1769. By William Smith, D.D., Provost of the College of Philadelphia, John Lukens, Esq., Surveyor-General of Pennsylvania, David Rittenhouse, A.M., of Norriton, and John Sellers, Esq., one of the Representatives in Assembly from Chester county, the Committee appointed for that observation by the American Philosophical Society, held at Philadelphia, for promoting useful knowledge. Communicated to the said society by Dr. Smith, and to the Royal Society of London by Nevil Maskelyne, B.D., Astronomer Royal." And in the following year was published an "Account of the Transit of Mercury, November 9, 1769, observed at Norriton, Pennsylvania. By a Committee of the American Philosophical Society. Communicated by Benjamin Franklin, LL.D."

I am sure that now, a century later than the day on which your Society held its first regular meeting in its newly completed Hall, the feelings of good will between the two societies, and cordial desire for the continued scientific vitality and prosperity of both, are increased rather than abated. The Royal Society congratulates you on your entering upon the second century of corporate life in your accustomed meeting place.

In reading the words of the toast to which I am called upon to respond, the thought suggests itself that the century which ends to-night has, far more than earlier ages, seen these words become true, and true in a somewhat different sense from that which would perhaps most naturally have occurred to the members of your Society in 1789.

Then the symbols of the mathematician had indeed the same meaning for the eyes of men in every country, but save in this special field the stately and exact tongue of ancient Rome had scarcely ceased to be recognized as the only universal language of science and philosophy, requiring every one to come under its sway who would learn of his fellow-students or would communicate to them what he had to offer of newly discovered truth.

Since then the symbolic formula of the chemist, the stratigraphic section of the geologist, the microscopic photograph of the biologist, have all been brought to speak alike to every one who pursues the same line of investigation, and now the ever-increasing activity of the printing press and the telegraph tends more and more to render it a matter of small moment in which of the many forms of human speech a worker in science may originally put forth what he has to say: in how short a time will it be placed in intelligible form before the whole of the civilized world. The tapping of the armature to which science has given an articulate voice, or the gentle waving to and fro of the noiseless spot of light in a darkened room, speaks forth in the languages of all nations, and without irreverence may it be said that now "hear we in our own tongue, wherein we were born, * * * the wonderful works of God."

Familiar as is nowadays the remark that within the last century science has brought about the most marvelous exten-

sion of communication amongst men, it is perhaps to be doubted whether we yet see the full significance of this fact or appreciate its profound importance in the history of mankind. Yet how naturally, and by how simple an order of logical succession in the history of science itself, the "Letter of Benjamin Franklin, Esq., to Mr. Peter Collinson, F.R.S., concerning an electrical kite," published in Vol. xlvii of the Philosophical Transactions, is connected with the possibility of the message from Sir George Stokes, instructing me to be here to-night, which was darted westward a few days ago beneath the ocean's depth, with a speed that anticipated by hours the laggard turning eastward of the earth upon its axis.

As we think of the gradually expanding insight into the mysteries of nature which has come of scientific study in the passing years of the last century, of what was concealed from the workers in science in 1789, and is seen of all men to-day, we naturally wish that those who then saw dimly could share the larger measure of light which is given to us, and as naturally we think, and with some sadness, of the yet brighter light which those who are to come after us will undoubtedly enjoy. The words of Seneca suit our mouths as well as they did his: "*Quidem multa venientis ævi populus ignota nobis sciēt. Multa seculis tunc futuris, quum memoria nostri exoleverit, reservantur. * * * Rerum natura sacra sua non simul tradit. Initiatos nos credimus: in vestibulo hæremus.*"

Such thoughts bring with them the seemingly opposite yet both together best results of the pursuit of science, a profound and exulting appreciation of the advance already made in knowledge of the universe spread out before us, and at the same time a yet more profound humility in face of the far greater ignorance which hides from us the more wondrous things beyond.

MR. VAUX: The next toast is, "OUR KINDRED SOCIETIES IN EVERY CLIME," and we would suppose that to that sentiment it was very easy to make a reply, but the difficulty was where to look for the replier. It seemed reasonable to think that the proper place to look for it was where arts and sciences were in a highly flourishing condition, so they sent to Boston, and Prof. Joseph Lovering, LL.D., President of the American Academy of Arts and Sciences, was requested to be present this evening and make a reply to this toast. He is not here. He wrote a letter which indicated, as I understood, that he would be here, but something has prevented his coming. I have, on behalf of the Committee, been requested to interpret this absence, but it is a very difficult thing to put the interpretation which I hope will be agreeable and acceptable to everybody here and at the same time acceptable to my distinguished friend, Dr. Lovering. The arts and sciences of New England are not to be present, and I have no reason to give why not. So the art and science of it is to leave me the excuse, and I make the excuse for him. Yet the art and the science belong to that part of the globe of which he is an inhabitant. Therefore, we will have the Art and Science omitted, and ask you gentlemen to drink to the third toast: "ALL RESEARCH INTO THE BOOK OF NATURE HAS NOT DISCOVERED AN ERRATUM." It seems to be a generally accepted idea by those who are philosophers and scientists that the best possible reply which could be made to that sentiment will be given to you by Sir Daniel Wilson, LL.D., F.R.S.E., President of the University of Toronto, and if he has found any one of those errata he will have the opportunity now to tell you which one it is.

MR. PRESIDENT AND FELLOW-MEMBERS OF THE AMERICAN PHILOSOPHICAL SOCIETY:—In the part which you have assigned to me in this Centennial Commemoration, I find myself called upon to deal with a subject the compass of which is wholly beyond my powers; as it is all too ample for the limited time available. In the eloquent address in which you, Mr. President, retraced the history of this, the oldest among the scientific societies of America, you found an hour too brief for a review of the events of the century which to-day completes its cycle; and now I find myself called upon, in the briefer limits at my disposal, to verify the entire Book of Nature, and demonstrate the faultless perfection of the record. Looking back over the immeasurable ages of the past, and turning to the equally incomprehensible vastness of the visible universe, hours, instead of minutes, would fail, in the most superficial effort at such a review.

Amid the brightness of this festive commemoration, the temptation is rather to leave the past unheeded, and to take the wings of fancy—or, better still, the intuitions of science,—and anticipate the marvels of the coming time; those fairy tales of science that surpass all the wonders of romance. But your behest must be obeyed; and it will perhaps most aptly meet present requirements if I select from the manifold phases which challenge our consideration two suggestive aspects of the comprehensive subject, which in some sense may serve to epitomize the past and the present for such brief review.

When the fiat went forth, formulated in words that might fitly constitute the motto of this, the oldest among the philosophical fellowships of the New World: "Let there be light!" the abyss flashed into cosmic brightness and beauty; and the illimitable depths of space, illumined with the splendor that enkindled suns, and awoke the myriad worlds to life, traced for

us the first page in the book of nature. Your theme invites our attention to it under the apt metaphor of a book; no chance medley of the materialist, or mere evolution of time out of chaos; but a volume of well-ordered method and sequence, revealing on every page the purposed design of its Author. Turning then to the pages of this ample volume, astronomy is the science which, dealing with the visible present, appeals even to the uncultured mind—to the Syrian shepherd, as to the Indian hunter on the prairies,—in proof of an all-mighty, an all-wise Creator. With upturned eyes, savage and sage alike peer into the immeasurable depths of space lighted up with its galaxy of worlds and suns, marshaled in such harmonious symmetry that they unmistakably reveal the evidence of design, order and law; the governance of a supreme Intelligence. Nor is the royal psalmist alone in learning from them the lesson of devout humility, as he considered the heavens, the work of God's hand; the moon and the stars which He has ordained; and realized the marvelous compass of that overruling Providence that can still be mindful of the meanest of His creatures.

The old Greek, perplexed though he was by the misleading complexities of a stellar universe, revolving, as it seemed to him, around our own little planet, nevertheless realized such a rhythmical harmony and beauty in the motions of the heavenly bodies, cycle on epicycle, orb on orb, that he listened if perchance he might catch some echo of the music of the spheres which seemed inseparable from that stately measure of their nightly round. The same fascinating idea is revived by our own Shakespeare, in lighter mood, when his Venetian lovers meet in the moonlit gardens of Belmont. I say, in its amplest sense, "our Shakespeare," for in this reunion with so choice a gathering of American friends it is pleasant to recall

the community which we realize in the matchless literature of our mother tongue. With an altogether peculiar bond of kinship, akin to that recognized among the remotest wanderers from the Hellenic fatherland; on the Euxine, at Cyrene, Massilia; or in furthestest colonial outposts on the Iberian shores; we, "who speak the tongue that Shakespeare spake; the faith and morals hold that Milton held," may surely claim to be one. And so, as such, with Shakespeare for our guide, we renew the fond imaginings of the old Greek; as Lorenzo, in that moonlight meeting with his bride, in "The Merchant of Venice," points her to the floor of heaven, all thick inlaid with patines of bright gold, and exclaims:

"There's not the smallest orb in all the heaven
But in its motion like an angel sings,
Still quiring to the young-eyed cherubim,
Such harmony is in immortal souls;
But while this muddy vesture of decay
Does grossly close us in we cannot hear it."

Thus, as it would seem, not alone the gaze of the wondering on-looker, but the combined research of ages, concur in the verdict which your thesis affirms. We, too, in the spirit of the old Greek, may assuredly recognize the perfect harmony and order which everywhere reveals a Creator's hand. Alike in the splendor of that universe which greets our eyes, as with optic glass we strive to fathom its mysteries and to interpret its chronicling as a page of Nature's volume; and in the minutest atom, that the microscope reveals, we recognize the consistent harmony of a Divine law-giver. For the same law that moulds a tear, and shapes the dew-drop, holds the planets in their course, and regulates the form and motions of suns and worlds. The astronomer, with ever-increasing aids of science, penetrates into remoter depths of space only to bring back

fresh evidence of an all-pervading harmony amid its countless members. In confident reliance on the orderly movements of the planets, Leverrier and Adams independently wrought out results by means of which the telescope of the observer was pointed to the unheeded speck, invisible to the naked eye; and the planet Neptune was added as a new member of our solar system. The science of Chemistry, too, unexpectedly directing its operations to a sphere which had hitherto seemed to lie wholly beyond its province, by means of spectrum analysis brings back to us the reassuring disclosure that, amid endless diversities in their combinations, the remotest of those suns that light up the firmament are fashioned of the same elements as this little planet-home of man. Such are some of the teachings of science. But even the untutored eye sees enough in that mysterious vault that nightly spans for him life's fleeting hour, lit up with the splendor of its myriad suns, and the star-strewn milky-way, to realize that no errata need be appended to the volume of nature. It may be that every star is the centre of a system of worlds, the abode of intelligences more gifted than we are to interpret the wondrous volume; but this at least we do know that they shine for us, lighted up from the same source which enkindles the central luminary of our own little group of planets; stirs our earth in its winter's sleep; quickens the buried seed, and the dormant animal life; and is but another aspect of that force which moves the worlds.

Thus we recognize the indices of an all-pervading harmony, disclosing to every eye evidence of rule, of law, and so of the Divine law-giver, alike in the orderly movements of suns and planets, and in the mysterious wanderings of the comet that blazes in the splendor of its perihelion and then returns in darkness to unknown depths of space. This is for us a living present. But, so also, in another chapter of the volume of

nature we learn of the same harmonious reign of law through countless ages. Geology is the record of the past; and with its aid I invite you to turn for a moment to that testimony of the rocks which the palæontologist has deciphered for us; testimony which embodies the history of life through all the æons back to the eozoic dawn. Biologist and palæontologist had alike recognized the orderly progression, as, in apt accordance with your metaphor, they turned over page after page of graven strata, till the record of life closed—or seemed to close,—in the azoic rocks. But the great naturalist, Charles Darwin, who so recently passed away, has revolutionized biological science with the demonstration of that process of evolution which has guided all the manifestations of life from the lowest to higher forms. Here accordingly a new reign of law appears, as we recognize one after another of the progressive steps through which, in the calm, unresting process of evolution, life has advanced onwards and upwards into ever more complex forms, through countless ages fashioning the present out of all the past. Yet here I, for one,—I know not how far others may sympathize with me,—but I am constrained to pause upon the threshold of that essentially distinct sphere of the psychologist where man, with reason as his distinctive attribute, stands apart from the whole irrational creation. It is not as a mere matter of sentiment, nor even because of any too literal reading of the narrative of creation, when man “became a living soul,” that I feel constrained to withhold assent to the hypothesis of the evolution of mind. By no inductive process does it seem to me possible to find the genesis of reason in any manifestations of intelligence in the brute creation. The difference between a Newton and an Australian savage is trifling when compared with the great gulf that separates the latter from the highest anthropoid. I look in vain in all the many mani-

festations of instinct or rationality in the latter for any germ of a moral sense, of a spirit of religious worship, or the anticipations of that higher life and immortality, which Socrates, Plato, and the wisest of heathen philosophers shared with Paul and Augustine, and which are dimly present even in the savage mind. I feel constrained to reject, even as an hypothesis, the gift of reason, and the "living soul," by any conceivable process of descent. All the arguments based on heredity and environment, instead of helping to account for the exceptional genius of a Plato, an Aristotle, a Dante, a Shakespeare, or a Newton, only make more obvious the incompatibility of such manifestations with any evolutionary theory. Geology may reveal the onward march through countless ages, refashioning continents, and advancing in orderly progression from the lowest to ever higher organisms. One common plan of structure may be traced throughout geological time, amid all the manifold diversities of vertebrate life; even as one law is found to pervade and control the whole visible universe; but

"Though worlds on worlds in myriad myriads roll
Round us, each with differing powers
And other forms of life than ours :
What know we greater than the soul ?"

Life is as great a mystery as ever; and that which humanity comprehends as its immortal essence can have no relation to any progressive development of mere physical structure. The mind is the standard of humanity. Man alone, savage and civilized alike, looks before and after. Nature and experience alike confirm the radical distinction between him and the irrational creation. Psychology can only know the physical as subjective. Nevertheless in that faculty of reason: the distinctive essential of man, whereby he is able, not only to look forth on the visible heavens and realize in some

faint degree the cosmos, but to apprehend its lesson of humility: we read the brightest of all the illumined pages of the book of nature, and find no flaw. The very fact that "this brave overhanging firmament; this majestic roof fretted with golden fire," expanded before our nightly vision, seems to us infinite in its compass, is in itself the index of an apprehension that enthrones reason apart from the highest attributes of irrational life. The physicist and the metaphysician have diverse conceptions of space; but practically, for us, the impossible is to conceive of limits to the universe. Imagination speeds from star to star through all the fields of space, guided by the strictest mathematical induction, and finds everywhere the same majestic harmony. No chaos lies behind the heavens, nightly revealed anew in all their mystery as evening draws her azure curtain athwart the sun. It is indeed the garish day, with its mundane round of petty cares, that curbs the wings of fancy, blinds the eye of faith, and shuts out heaven from our view. But who can set bounds to that mighty vision? If we sphere space, what lies beyond it? Still law, order, harmony; one overruling all-pervading influence, one Divine purpose. What can be behind it but God:

"One God, one law, one element,
And one far-off divine event,
To which the whole creation moves."

MR. VAUX: Dr. Wilson has given you a most able effort to discover errata, and I think all of you will agree that, after such a brilliant speech, full of so much science, philosophy, learning and culture, we will have to give up the idea that there is an erratum anywhere in the science of philosophy. But in order that you may have a counterpart in some degree to this

address, where the erratum has failed to be discovered, I propose to present to you now, another question which is somewhat akin to the one you have already heard discussed. It is found in these words, and it is the toast which I ask you to drink: "The successful pursuit of Science expunges error." That is the reason why Dr. Wilson could not find the erratum. "THE SUCCESSFUL PURSUIT OF SCIENCE EXPUNGES ERROR: IT NEVER ANTAGONIZES TRUTH." In order that you may hear an equally brilliant address upon this view of the subject I beg to call upon the Hon. Lyon G. Tyler, M.A., President of William and Mary College, to respond.

MR. PRESIDENT AND GENTLEMEN OF THE AMERICAN PHILOSOPHICAL SOCIETY :—To be called upon to respond to a toast of the character of that just proposed is a compliment which I highly appreciate. Coming as a stranger among you, I might naturally feel appalled at the magnitude of the sentiment it conveys. Rome, it is a trite and true saying, was not built in a day, nor could I in a ten or fifteen or twenty minutes speech do justice to a sentiment which began its victorious crusade against error when the centuries were young, but which now stands upon the starry summits of success, overlooking all human thought and human action.

Yet, Mr. President, I am glad that this opportunity is presented to me this evening. We, Virginians, are often accused of vanity, but I am ready here to-night to admit, while I claim that we are the best people, that the Philadelphians are the next best! I am even disposed to go further than that. I had a brother, Robert Tyler, who lived in your midst some twenty odd years as Prothonotary of the Supreme Court of the State; was Chairman of the Democratic Executive Committee of the

State of Pennsylvania ; was the fast and firm friend of that good old man, James Buchanan, and who did better than that in taking a wife from among the Pennsylvanians ; therefore, I can claim to have a kinship with the Philadelphians, and admit them into the Virginia fraternity along with me !

The cordial reception which has been extended to me since my first arrival here ; this feast of reason and flow of soul, where philosophy presides over the inner man, science holds the wine cup, and Philadelphia, the city of the gods, sacred to independence and fraternal love, gives the welcome, are, in the language of the Irishman, sufficient to make my face one broad smile from the crown of my head to the sole of my foot. I am glad I stand here on this occasion, and say to you, as an humble representative of William and Mary College, that that ancient institution, which gave to the American Philosophical Society a President, which gave to science the precious gift of her Jefferson, and to the country at large her Monroe and her Marshal, is full of fraternal greetings on this centennial occasion to the most ancient philosophical society in America. Veterans in a grand common cause, it is but right that they should meet around a common table and pledge each other's health now and forever.

Although, Mr. President, the antecedents of William and Mary College go back to the year 1619, when the first project of a university was started in America, its charter was not obtained until the year 1693, just fifty years, a semi-centennial, ahead of the foundation of this association ; and in this age of centennials and semi-centennials (and I understand that the American Philosophical Society has had a full share of them already in the past), it may be worth while to know that old Benjamin Franklin, the founder of this Society, on the occasion of a personal visit to Williamsburg, received, in the semi-cen-

tennial year of his age, in 1756, the proud honor of Master of Arts from the College of William and Mary, the first degree ever conferred by that institution on any man. Thus Virginia and Pennsylvania united in doing honor to the man whom Lord Chatham pronounced "not only an honor to the English people but to human nature."

In Franklin's diploma, a copy of which is preserved upon the college records, the faculty declared that their action had been taken in order to show to the Virginia youth an example of a truly noble man, or, as it is better expressed in the Latin, *Juventuti Virginiensi exemplum valde egregium*.

Nor, if we can judge by subsequent events, was that example lost upon those for whom it was intended. As Franklin was the first man to make science, which had been previously merely "an object of admiration in temples and palaces," a handmaid to the common arts and uses of life; as he was the first to teach that she should be made to minister to the wants and comforts of society; as his whole life and his whole action enunciated a practical spirit; so twenty years later, when the rebellion of the colonies ensued, that practical spirit was shown in thousands of Virginians formed upon the model of the illustrious Pennsylvanian's example; in a Washington who led our army to victory, in a Jefferson who reformed our laws, and in a Marshal who construed them—all of them like Franklin eminently plain and eminently practical men. And that spirit thus set working, according to the sentiments of this toast, *expunging error and maintaining truth*, has gone on operating to the present day; it has produced a Fulton, a Morse, a Maury, a Bell and an Edison, until to-day we stand in not only what we may pronounce the age of centennials, but "an age of ages" whose common maxim in all the departments of life—in history, government, politics and poetry—is :

"The greatest production in the shortest time and at the least cost, the best markets and the quickest returns."

The marvels of our country's progress have been, as we all know, the theme of constant oratory; but so unparalleled has that progress been that even the language of wise and sagacious statesmen has failed to portray the glorious and gorgeous destiny of the States. I remember two instances in our national history which conspicuously illustrate this failure to appreciate the giant forces at work in our midst. In 1824, as sagacious a statesman as President James Monroe, as much as he had seen of the progress of the country in his day, proposed to colonize the Indians of Western New York in Wisconsin, under the impression that it was a part of the country so remote that they would not be disturbed for many years to come; yet in eighteen years, Wisconsin, no longer naked in the savage aspect of her wilderness, but clad in the noble garments of a refined and pure civilization, was knocking at the doors of Congress for admittance as one of the free and sovereign States of this Union. And in 1825, Thomas H. Benton, a distinguished Senator of the United States, who, like science, prided himself on being "an expunger" in General Jackson's time—you remember the resolution that he expunged in the Senate—pointed to the ridge of the Rocky mountains as "the convenient, natural and everlasting boundary of the Union;" yet in twenty-two years the eagle of the Union, like the true bird of Jove, had winged its flight across those majestic ranges, over boundless plains and endless forests, to rest his pinions upon the golden sands of California and bathe his royal plumage in the waters of the great Pacific.

However much the men of America have differed in opinion upon the issues of politics and questions of party; however much the New Englander condemned and disapproved the war

of 1812 declared by a Southern administration; however much the same New Englander disapproved and condemned the annexation of the imperial domain of Texas, opening up the great and noble West; and however much the men of the South condemned, in 1861, the action of the North in invading their firesides and carrying desolation on wings of fire far and wide through their borders, yet I thank God that in the result they are all of one opinion. The New Englander is proud of the fame won by the gallant Yankee tars upon the billowy deep in the war of 1812; his ships and his railroads have peopled the barren Mexican territory, won by the policy of annexation, with a busy, industrious and thriving population; and the men of the South rejoice to-day in the preservation of the Union of our fathers, and unite in the hope that God's infinite mercy may preserve it for ages to come!

At the bottom of all our progress is science, "the expurger of error" and the maintainer of truth, whose laws are twofold—first, that the operations of nature are regular and immutable, and, second, that they are one. Aye, there have been ages, and those ages are not remote, when men groveled in the worst forms and orders of superstition; when, as Buckle relates, in Scotland, two hundred years ago, to be in a constant state of affliction was considered to be the prime object of existence; when the most innocent relaxations and amusements were prohibited; when it was considered a sin to hold market on a Saturday or Monday because the preacher said it was so near Sunday; when that innocent amusement of our youth, swimming, was considered unlawful for Christians at any time, even on week-days, and cases were cited from the pulpit how God had shown His disapproval of this carnal practice by taking away the lives of divers reckless youths while engaged in it; when a minister, in order to teach this doctrine of affliction

and self-torture declared that David had never so sweet a time as when he was pursued like a partridge about the hedges by his beautiful son, Absalom; and when bear-baiting was prohibited, not because of the pain it gave the bear, but of the pleasure it gave the people.

But those times have passed forever. Science took up the cause of suffering humanity, and by familiarizing men with the first of its laws, by familiarizing them with conceptions of order and regularity in the operations of nature, taught that God's work was too infinitely grand, too majestically perfect, to require His interference every day to keep the system going, and that "every gratification of sense and of intellect was justifiable which stopped short of injury to the man or injury to others."

But it is the second characteristic of science that we are interested in more particularly—the unity of its laws, manifesting itself in different forms and forces, which are all one, that holds the destiny of the future. The fact is, the great future which lies ahead of us is one grand unity of results; and, in words not original with me, this age is to go on growing better, purer and faster, building schools, doubling its power of machinery, trebling its exports of cotton and woolen goods, and "sending forth its freights as missionaries of truth to all lands," until by the homely influences of modern trade, which laugh at the tinsel of ancient parade, by the interchange, if you please, of tender courtesies between corn and cotton, by the billing and cooing of account books, ledgers and bills of exchange, by the electric whispers of telephonic messages, the consummation of science is to be witnessed in the unification of all things, in the destruction of theologies of narrow, bigoted creeds, blood stained through the centuries, and in the knitting together of all men in one religion breathing the pure spirit of

God; in the quenching of local jealousies and sectional animosity—not by the obliteration of national or State lines, nor by the destruction of man's individuality, but rather by the growth of a public opinion which shall be crystallized in a universal law founded on the principle that no man can be benefited at the expense of another without in some measure injuring himself; and finally, gentlemen, in the confederation of all nations—and the sudden fall of Dom Pedro, in Brazil, gives color to the thought—into a grand, harmonious Republic formed upon the model of our own Union of indestructible States, flying a flag, not of forty-two stars, but one blazoned with all the stars of heaven, thus realizing that sublime and divine condition of the world which the rapt poet sees in his vision :

“When the war drums throb no longer,
And the battle flags are furled,
In the Parliament of man,
The federation of the world.”

I have only now to thank you for the kind and cordial attention which you have given me, and to say to you that old William and Mary College has arisen in strength like the Phoenix from her ashes, and that she numbers upon her roll, in the second year after a suspension of seven, 172 students, and that her number will run up in the next two or three years, I predict, to three and four hundred. I feel from the letters that we have received from all parts of the country—from the pines of Maine to the magnolias of Alabama—that we have the heart of the Union with us. In three years hence, we celebrate the bicentennial anniversary of William and Mary College, and my last words are to invite all here present to be there on that occasion; and if we cannot show you any great public halls like what you have here in Philadelphia, nor any

great public buildings, we can at least atone in great measure for the lack of these things by giving you a hearty old Virginia welcome.

MR. VAUX: After the eloquent discourse which we have heard upon the preceding toast, it does seem that there should be now brought to your attention a rather different philosophical and scientific view of the reasons why Science and Philosophy have been thus apostrophized, explained and defended. As you all will admit, the task, which I propose now to present, in its accomplishment is one of difficulty and requires to be handled by a master-mind. The Committee, in viewing the subject in this light, has to ask your attention to the distinguished scholar who has been selected to reply to the toast now propounded to you: "MENTAL ANALYSIS IS THE EFFICIENT SOLVENT OF MANY DIFFICULTIES IN SCIENCE AND PHILOSOPHY." If there is one man in America who is competent, even in the few minutes which are allowed on this occasion, to perform this task with brilliant effect, it is the author of "Ultimate Philosophy." I call upon Rev. Charles W. Shields, D.D., LL.D., of Princeton College, to reply.

MR. PRESIDENT AND GENTLEMEN OF THE AMERICAN PHILOSOPHICAL SOCIETY:

When I accepted the invitation to this banquet I knew that it involved a rare privilege and a high honor, but I accepted it with some misgivings. I felt and still feel quite unable to respond in fitting terms to the sentiment which my learned and witty friend has announced so kindly in connection with my name. I am glad to find that he sympathizes with me fully in the difficulty of the theme.

It is true that I have been an earnest student of Science and of that Philosophy which is the science of science during the time that has passed since I left Philadelphia—a city in which my early labors found generous appreciation, to which I became attached by the strongest ties of my life and which I have ever remembered, as the exiled Greek remembered his *dulcis Argos*, as the home of art, and letters, and refinement. But of the studies of these past years it would not become me here to speak. If any difficulties in science and philosophy have been solved by them, they have not been in vain.

It is implied in the toast, to which I am speaking, that there are difficulties in Science and Philosophy and that mental analysis may help to solve them. It is certain that there are difficulties in Science. If we analyze it into its component elements we shall find that it involves much faith as well as knowledge; it involves faith in the uniformity of nature, a uniformity which has never been proved and which can never be proved except within the narrow limits of our own experience, and which even there is disproved whenever you perform the miracle of lifting a stone from the earth; it involves faith in our own cognitive faculties, which the sceptic will claim to have been delusive and which, as a matter of fact, have misled mankind for ages; it involves faith in some ultimate Power or Principle upholding this assumed uniformity of nature and this assumed trustworthiness of our faculties, and our agnostic friends tell us that this ultimate Power or Principle is simply unknowable, inconceivable, a bundle of contradictions.

On the other hand, there are also difficulties in Philosophy. If we analyze its various pretensions we find a large amount of ignorance as well as knowledge. The physical philosopher looks with wonder at the marvelous discoveries of modern

science in the realms of physical inquiry, but he soon sees that they are but as a vanishing point before the infinite unknown, a grain to the mountain, a drop from the ocean. The metaphysical philosopher dreams that he has solved the problem of the universe in terms of mere logic, but this is a problem which, if solved at all, could only be solved by an infinite Intelligence. The theological philosopher claims to have penetrated by means of revelation even to the secret counsels of the Creator Himself, but that very torch of revelation only shows him mysteries still unrevealed and unrevealable, and so our gnostic friend at last lands us in absolute ignorance and admits that the ever knowable is still the ever unknowable.

Is it not evident that both parties, both schools, need more of the caution of true science and of the humility of true philosophy? The simple fact is that the Agnostic and the Gnostic are better friends than they know, and cannot do without each other; they are only at work upon opposite segments of the same arch, which now seem fragmentary and hostile, but may be destined to meet as in the keystone of perfectible science upheld by reasonable faith.

Mr. President, I must not forget that I represent an institution which like this one is devoted to the advancement of science. Princeton College aims and claims to be a contributor to the existing stock of human knowledge as well as a distributor of knowledge through the channels of education, and to-day it may well congratulate a kindred organization with which in former times it has had at least one magnetic link of communication. Its ever-honored professor, Joseph Henry, as you know, followed in the steps of your illustrious Franklin, pursuing and completing the same physical researches. If I mistake not, his splendid discoveries were first announced to this Society, and put on record in the beautiful hand-writing of

its Secretary, Judge Kane, who welcomed the new knowledge with all his intelligent enthusiasm. It was from the lecture-room of Professor Henry that the first telegraphic wire was carried across the college campus at Princeton. That wire has since been carried by other hands around the globe. It was reserved for him to enjoy only the fame of those researches from which the whole civilized world has received so many material benefits. Like Agassiz, he was so strict a votary of science that he could not merge the discoverer in the mere inventor. He ever sought knowledge for its own sake and with no selfish motive. Science in his view was the birthright of humanity. And his philosophy was broad enough to include religion as well as science within its scope. Without posing in any religious character (if I may so express it) among his scientific brethren, he ever exemplified that full accord of exact knowledge with rational faith which distinguishes other members of this philosophical body.

If the American Philosophical Society has included in its ranks the self-sacrificing votaries of science, it has also included in them, and still includes, its munificent patrons as not less worthy a place in the same goodly fellowship. We recognize one of them sitting at this feast of reason whose praises I must speak wherever my tongue is loosed; a valued friend who has shown generously his appreciation of Professor Henry's disinterested services, as he has shown his appreciation of everything else that is noble and praiseworthy; a loyal Philadelphian, without whom no assembly of Philadelphians intent on any good work would be complete—Mr. George W. Childs.

What a noble monument does the American Philosophical Society present to us to-day! As we sat this afternoon, spell-bound listeners to the story of its origin and growth, so eloquently and touchingly told, who among us could fail to perceive

the imperishable worth of human science? Empires have risen and fallen in the Old World; the thirteen colonies have become the United States; the United States, surviving the shock of a civil war, have expanded over the continent; but this Society meanwhile has pursued its peaceful mission of accumulating and diffusing knowledge, unchanged amid surrounding changes.

What wonderful stores of knowledge it has gathered into its garner during these past hundred years! The heavens, the very heaven of heavens, have been unveiled and the birth and growth of worlds exposed to our view. The earth in all its past history has been retraced, and its extinct dynasties of life recalled as in a marvelous resurrection. Man has been placed at the summit of living nature with his evolving races, languages and arts. The soul itself, turning its powers in scrutiny upon itself, has been tracing the logical laws and processes by which it has accumulated this immense store of knowledge. Society, in the ranks of its humblest toilers, as well as in these higher circles of the learned, has begun to offer problems of which our wisest statecraft has not dreamed, and for the moral and religious solution of which the Protestant members of this philosophical association will welcome the aid of their Roman Catholic fellow-members, of whom I am glad to find we have a distinguished representative here to-night. Even theology is becoming the study of scientists as well as divines. And philosophy is collecting from all the sciences the materials for a complete system of knowledge.

What illustrious names have been enrolled in the transactions of this Society during the century passed! The choicest and brightest intellects of all lands have been gathered from all the sciences and crowned with your laurel as kings in the realm of knowledge and benefactors of mankind. Permit me,

in closing my brief remarks, to join together two of these great names as alike worthy of immortal memory: BENJAMIN FRANKLIN and JOSEPH HENRY—if the one, as it has been boldly said, seized the lightning in its course from heaven, the other has sent it forth as a vehicle of intelligence throughout the earth.

MR. VAUX: GENTLEMEN:—While you have been delighted, charmed and instructed by what you have heard from the oldest, and the uninterruptedly continued institutions of learning by their representatives at our festive board this evening, I think our feast of reason cannot well be concluded until you have had an opportunity to hear an equally learned address from the last-born of the learned institutions of the continent on which we live. Within the last few days, since this moon began to wane, there has been born in the Federal metropolis an institution of learning which, from all that we can know of its parentage and its purposes, is destined to be one of the most marvelous creations of this age, and in order that you may not go away to-night believing it is the old institutions which have the monopoly of science and philosophy, let me ask you to drink to the last toast: “THE LABORS AND ACHIEVEMENTS OF GREAT TEACHERS IN SCIENCE AND PHILOSOPHY LIVE AFTER THEM; THESE ARE THEIR MONUMENTS.” To so appropriate a toast gathered from all the learning that has come down to us through the Latin race, marvelous in its character, splendid in its condition, wonderful in its elements, eternal in its truth, let me ask you to listen in reply to the Rt. Rev. John J. Keane, LL.D., President of the Catholic University of America.

MR. PRESIDENT AND GENTLEMEN:—In the name of the Catholic University of America, I offer respectful homages and affectionate greetings to the American Philosophical Society, the youngest to the oldest of American institutions for the advancement of learning. In its name, I return heartfelt thanks for the broad-hearted liberality manifested by this invitation to your centennial celebration, and for the over-kind words with which my unworthy self has been introduced to you to-night. Such a spirit we honor as worthy of this City of Brotherly Love, and worthy of your great founder, Franklin, who was noted among all his contemporaries for the universality of his human sympathies, and who numbered among his friends and among his colaborers for our country's liberties our great patriot bishop, John Carroll.

In the name also of our University, I heartily endorse the sentiment embodied in the toast to which I have been so kindly asked to reply. We welcome and hail every advance in philosophical research and in scientific discovery, and we pay homage to the great men whom God makes use of for their achievement.

In the establishment of our own University, our purpose in opening our work with the faculty of Divinity has been to place the great God, the all-creating Father, in the very centre, in order that around him all philosophical and scientific studies may be harmoniously grouped and may move in order like the planets around their central sun; and we are firmly convinced that he not only deserves well of his fellow-men, but deserves well of Almighty God, who in any way adds to the store of human knowledge, since of God it is said that "He is light and there is no darkness in Him."

The inspired wise man has said that "man has been made a little lower than the angels and has been crowned with glory

and honor, and placed over all the works of the Creator's hands." He is therefore the divinely crowned monarch of creation; and whoever subjects to man any power of nature or brings under his dominion any of nature's realms is carrying out the behest of the Creator, is giving to man the monarchy that is his due, and should be numbered among the conquerors to whom the world pays homage.

"The heavens show forth the glory of God and the firmament declareth the work of His hands." He therefore who gave us the telescope that we might see deeper into those immensities; he who gave us the spectroscope that we might more intimately know their distances, their motions and the very mechanism of their construction; he who taught the photographic camera to fasten on an unfading retina what the great eye of the telescope beholds of solar convulsions or of starry depths—all these are bards who, whether they advert to it or not, chant to mortal ears the glory of the Creator, and are honorable in His sight and in the sight of all men.

The beneficent Father above has Himself united and almost identified well-doing to our fellow-men with love and dutifulness to Himself. Honored, therefore, of men and of angels should be those patient delvers in the realms of science, who teach us how to guard our health and our lives against the myriad enemies ever assailing them, and who cure or soothe any of the ills that humanity is heir to.

Man must learn from his fellow-men. Thought begets thought. He, therefore, is a benefactor whom all should bless who taught mankind to fasten thought in writing; and he who, by the printing press, scatters it to the ends of the earth; and what shall we say of that marvelous invention, on which your venerable President dwelt so eloquently to-day, which shall give us not only the stored-up thought, but even the

human voice that, perhaps centuries before, gave it utterance?

The good Father again has left to the intelligence and the free-will of His creatures, under the guidance of His Providence, the working out of the social problems which harmonize and organize the living of men together in human society. He is therefore an agent of our Father's care, as well as a benefactor to his fellow-men, who makes clear any great social principle that guides men in their social organization. Our Declaration of Independence is not only our country's Magna Charta, earning for its framers and signers our country's everlasting love, but it is an enunciation of social principles, standing like a great beacon light on the pathway of man's social advance, calling for the gratitude of mankind forever.

Human action depends for its wisdom and its utility upon its agreement with the great principles of truth and of duty which are the bases of philosophy. Any brilliant genius who would lead astray from those great principles is an *ignis fatuus*, who must lead men into the mire, whether it be social or domestic, or political organization that is in question. They, on the contrary, deserve all honor from God and from men who have power to declare those great principles with a voice that all must hear and heed, and who hold them up like a torch to guide the advance of mankind in those paths of morality and of religion in which alone, as our immortal Washington has warned us, can our country's prosperity be hoped for.

All honor therefore to the men who, in any realm of scientific, of philosophical, of ethical research, are doing something to increase the store of human knowledge, and all honor to this Association which gives to such men so efficient assistance.

In listening this afternoon to the address of your honored President, I felt, as he truly expressed it, that I was lifted up into another atmosphere from that which I had been breathing in the streets below. Never in my life did I feel more impressed with the sense of reverence than when carried back by the eloquence of this worthy venerable octogenarian to those who laid the foundations of our country's liberty. I honor the man, and I honor the Association over which he presides. I thank them again and again for the pleasure and the honor bestowed upon me this evening, and in the name of our University I pray that when your second centenary shall be celebrated you may have gathered around you, as you have to-day, the representatives of all the associations of this land and of other lands to pay you homage.

MR. VAUX: GENTLEMEN:—The duty which has been imposed upon me is now ended, and I deliver this most imposing company over to the guidance of the President of the American Philosophical Society.

In bringing the exercises of the evening to a close, President Fraley said:

MY FRIENDS: How shall I thank you for all that has occurred around me to-day? We have gathered in our ancient hall the resident members of the Society. We have brought around us our honored associates and friends from other States. We have shaken hands together over the memories of the past. We have indulged in the hopes of the future, and we are now about to separate in those fraternal relations which grow out of the common brotherhood of men, the participation in universal pursuit after knowledge, the indulgence of the

hope that the years to come will be crowned with new triumphs of discovery, with new stores of accumulated knowledge.

Looking forward to that ultimate consummation and bliss, which is promised to all those who look to the Supreme Intelligence that guides men in the paths of duty and in the performance of good works, glorious as the memories of the past are, bright as the hopes of the future are, I bid you now, in the name of our honored Society, a farewell for the present, and hope for many reunions of this brotherhood of friends ; and I pray that the blessing of that Great Creator and Preserver of the Universe may rest upon you, and that we may realize in the great hereafter the fellowship that we have been permitted to enjoy on earth. The hour has now arrived for our temporary separation, and I bid you an affectionate farewell.

Bishop Keane proposed the health of Mr. Fraley, which was drunk standing.